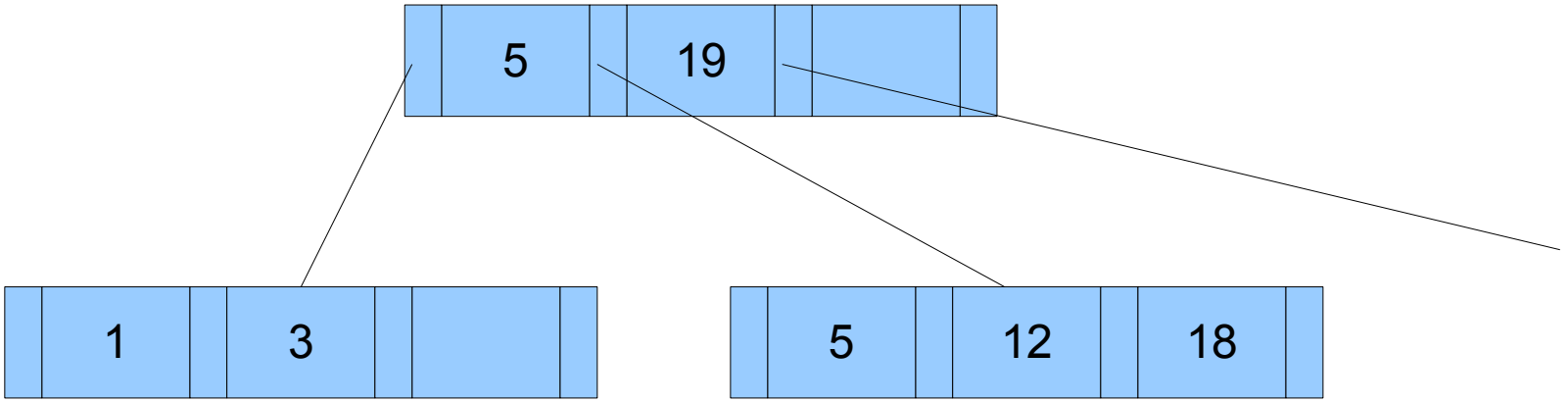
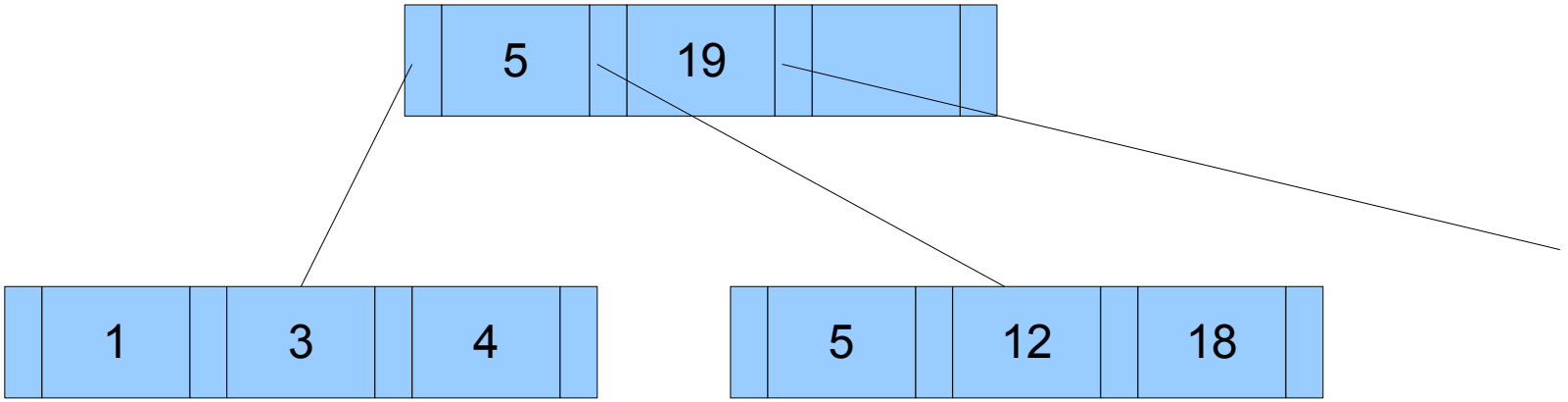
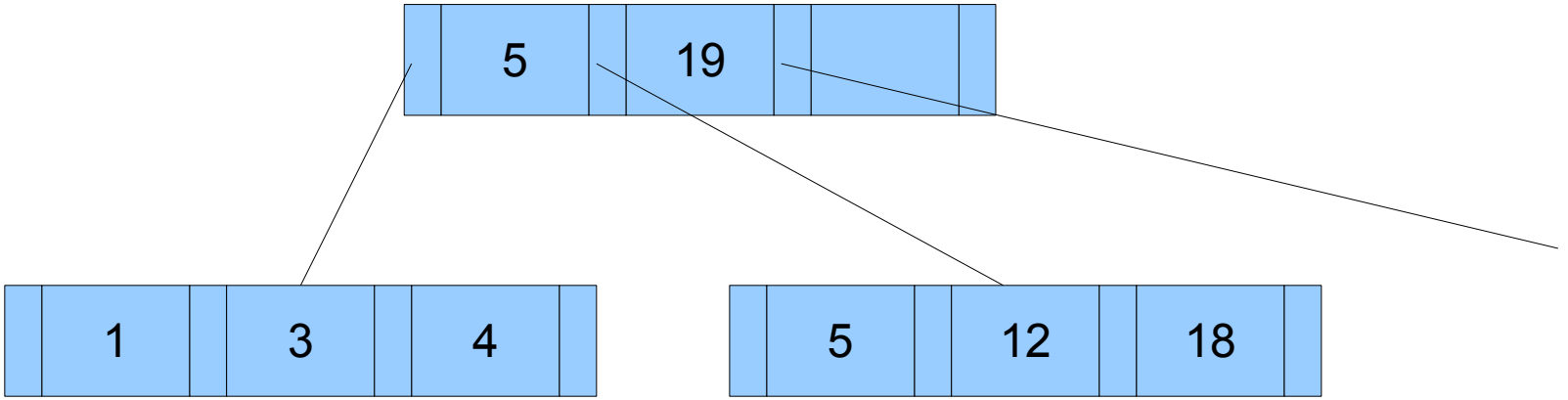
# Insertion into B+ tree



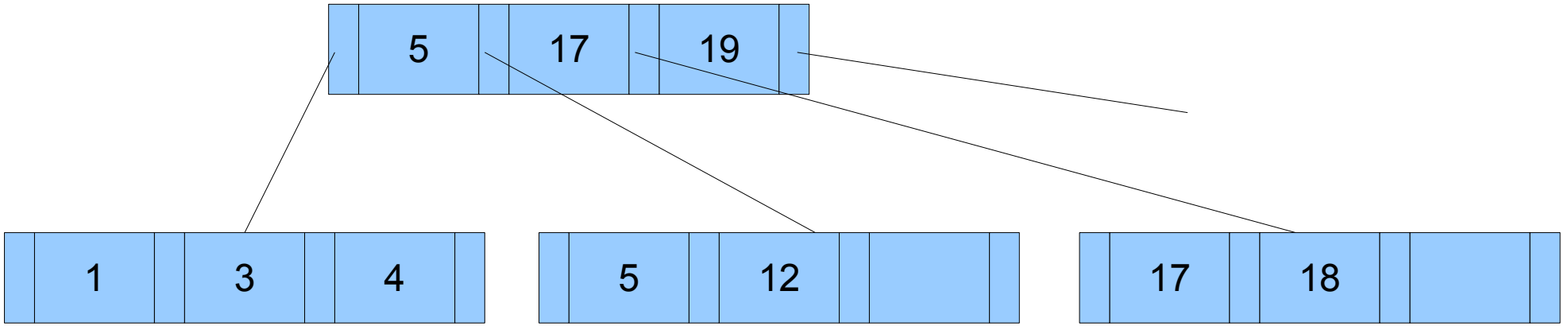

Add 4



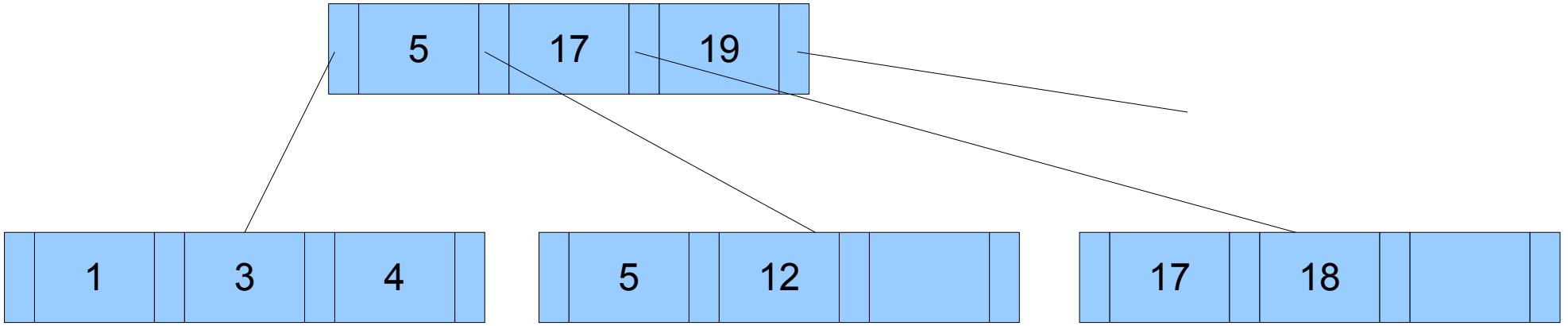
# Insertion into B+ tree



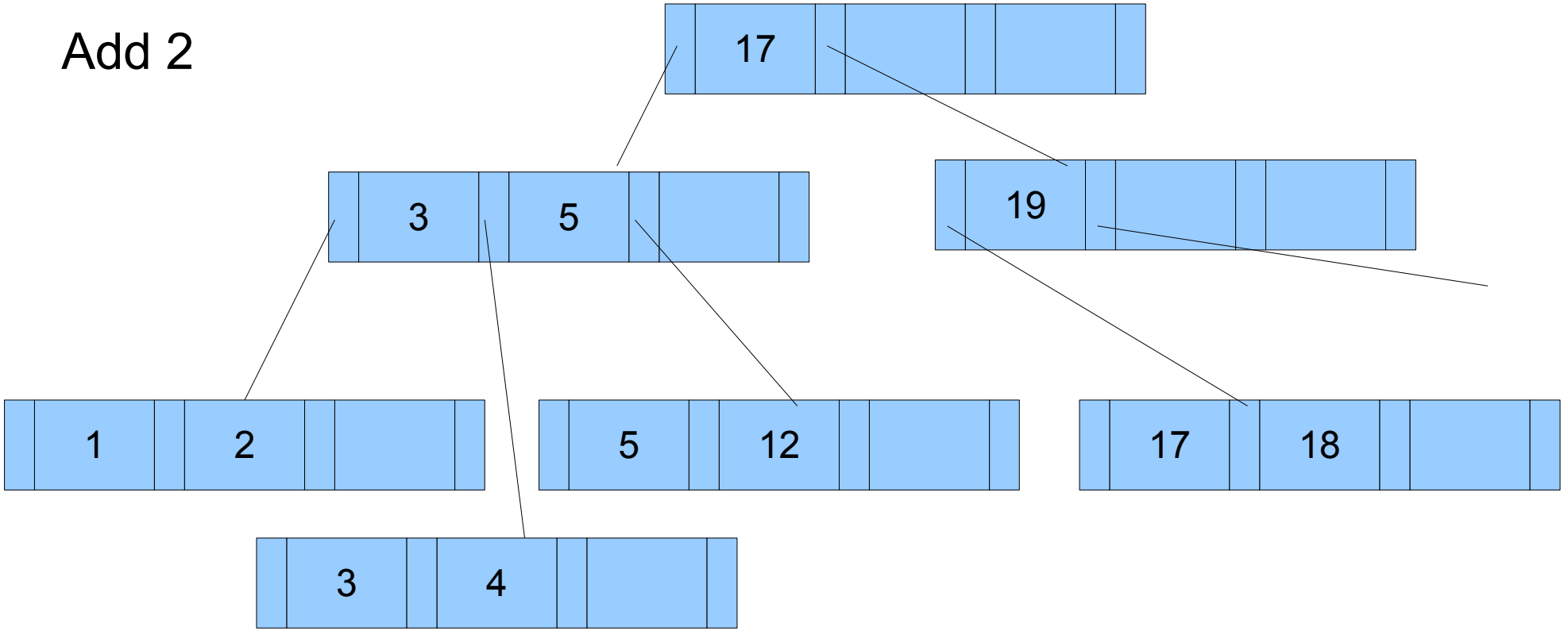

Add 17



# B+ tree insertion




Add 2

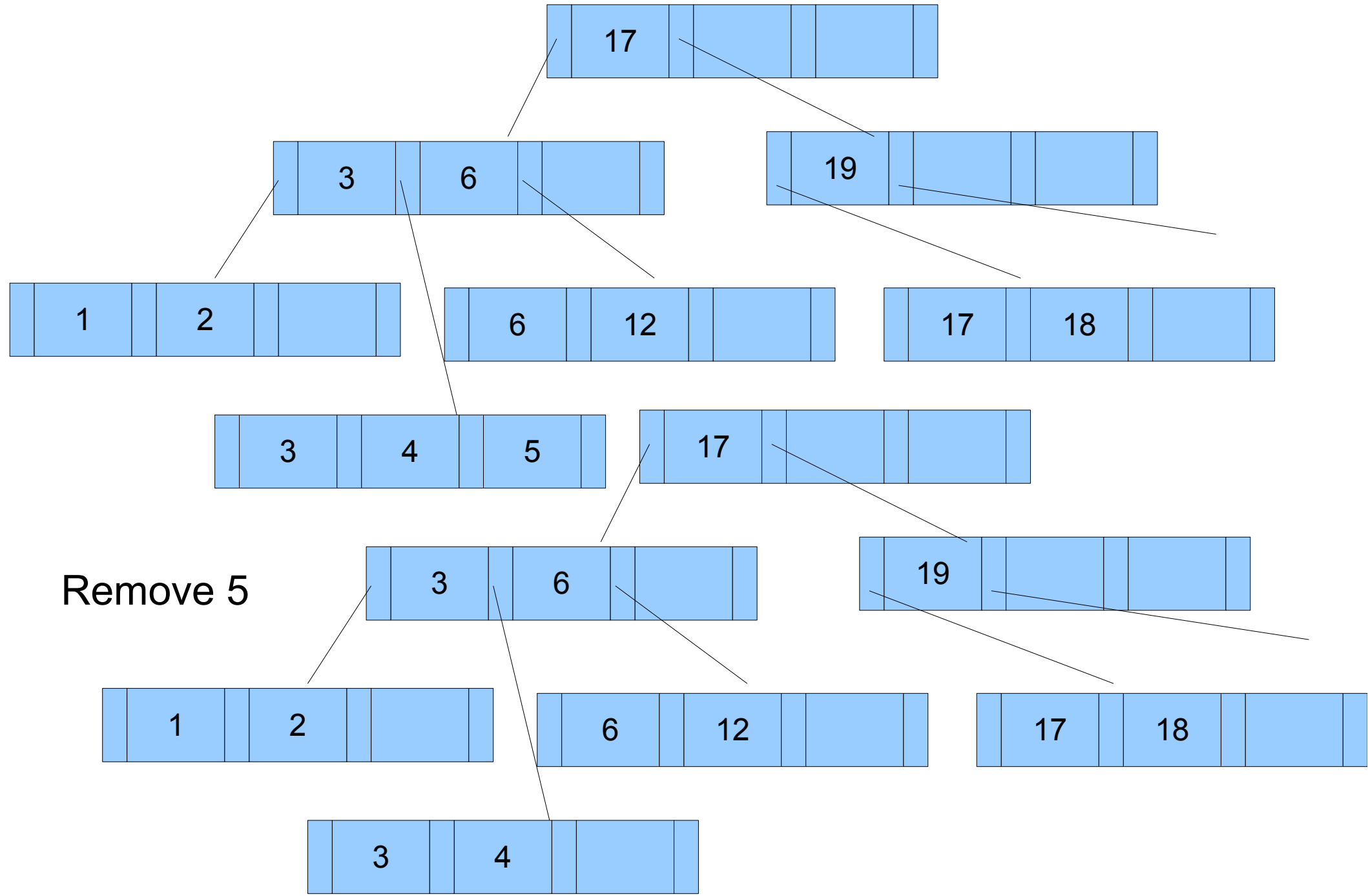


# B+ tree insertion

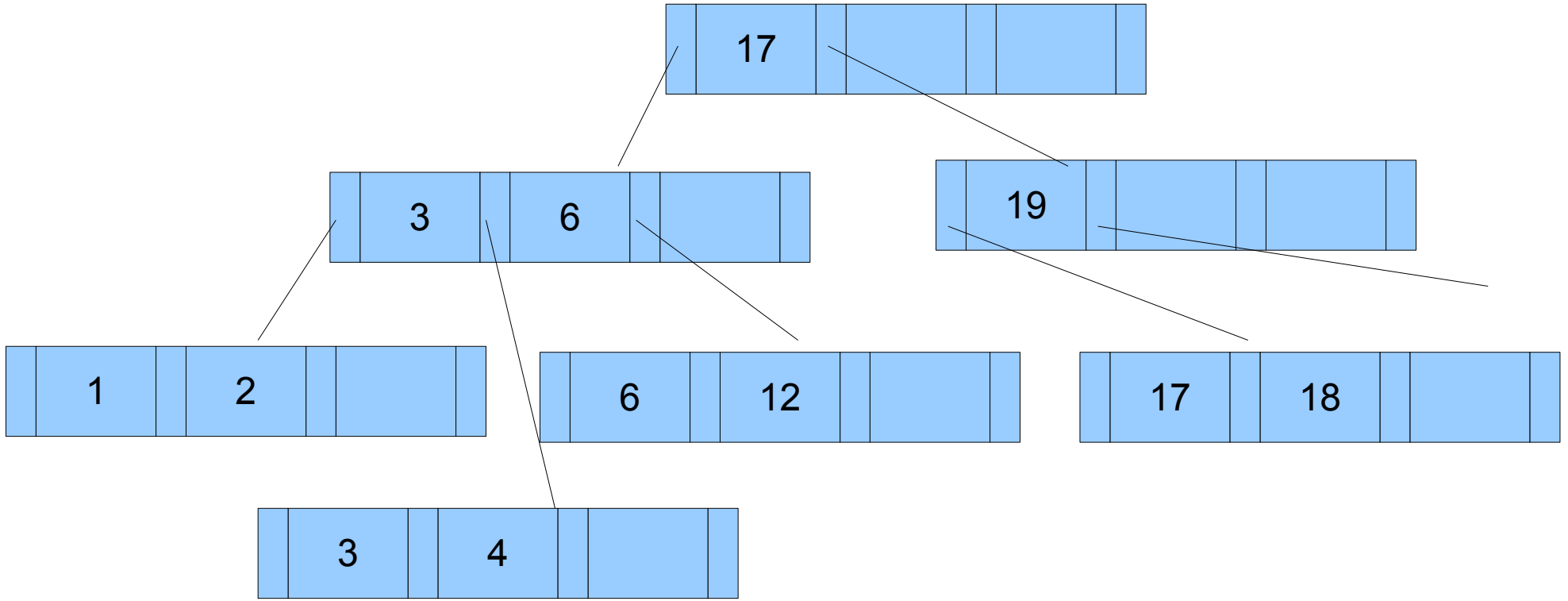
- When splitting leaf
  - lowest value in right part gets inserted into parent
  - value also stays in leaf
- When splitting internal node
  - lowest value in right part gets inserted into parent
  - value is removed from the right part

- Trick...
  - to avoid cascading insertions, simply redistribute values among neighboring leaves

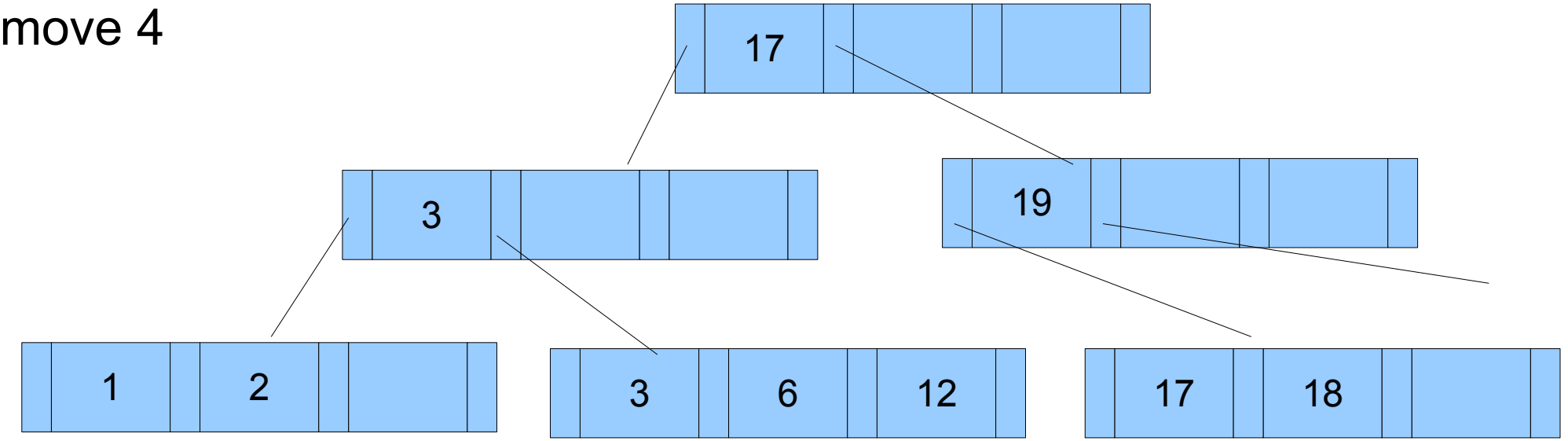
# B+ tree deletion



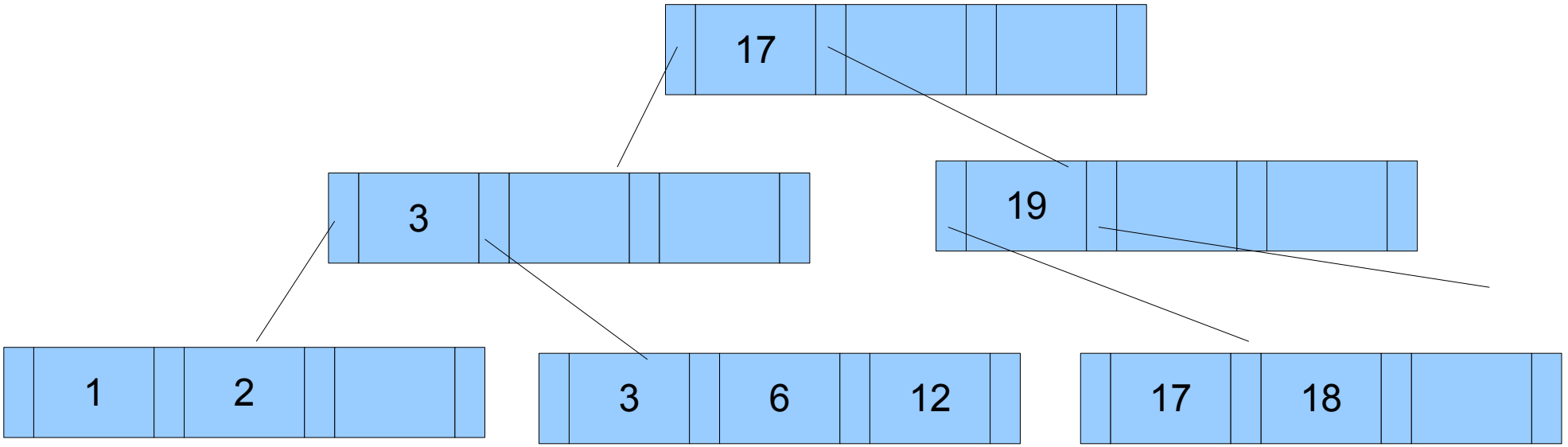
# B+ tree deletion



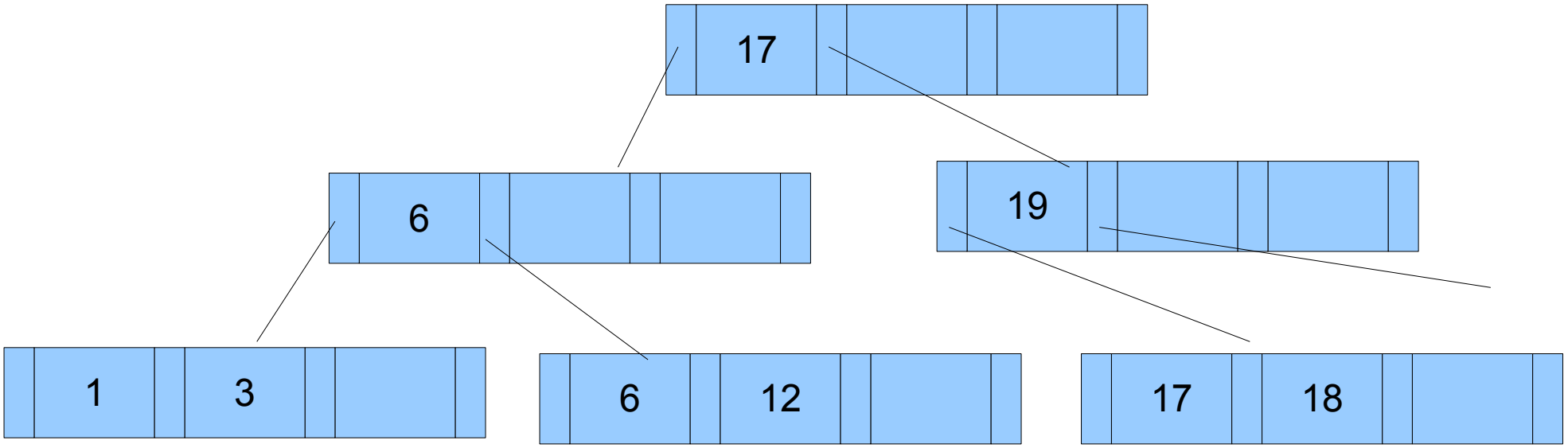

Remove 4



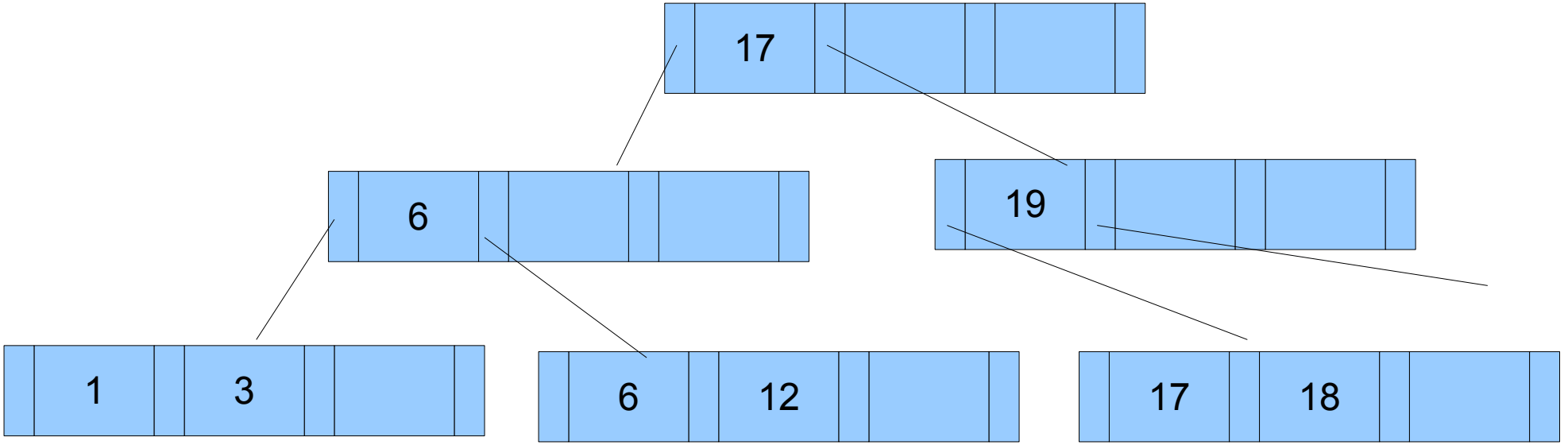
# B+ tree deletion



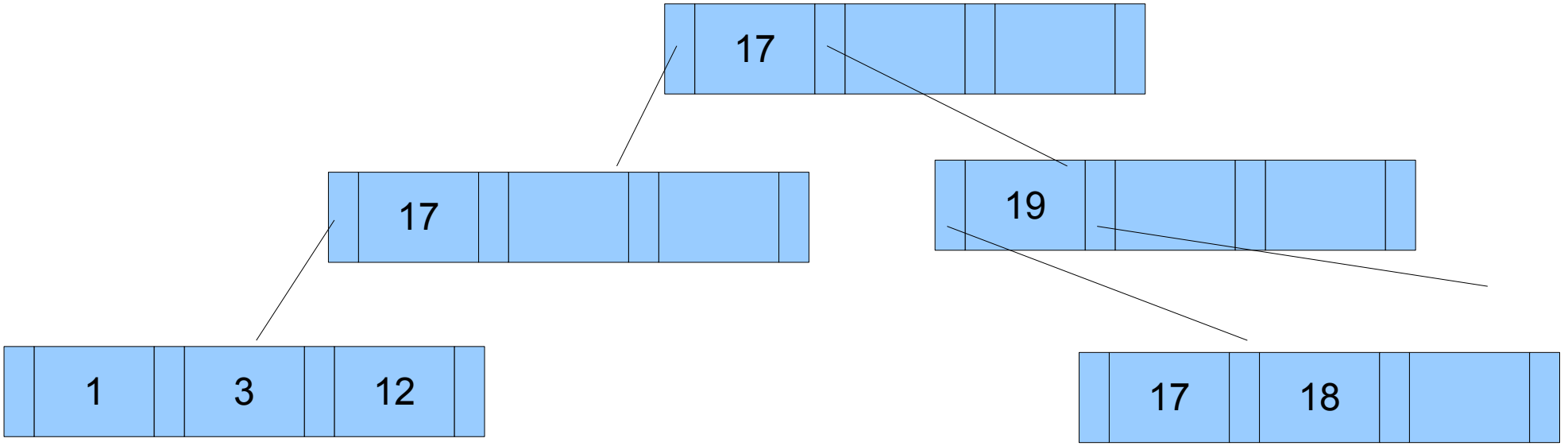

Remove 2



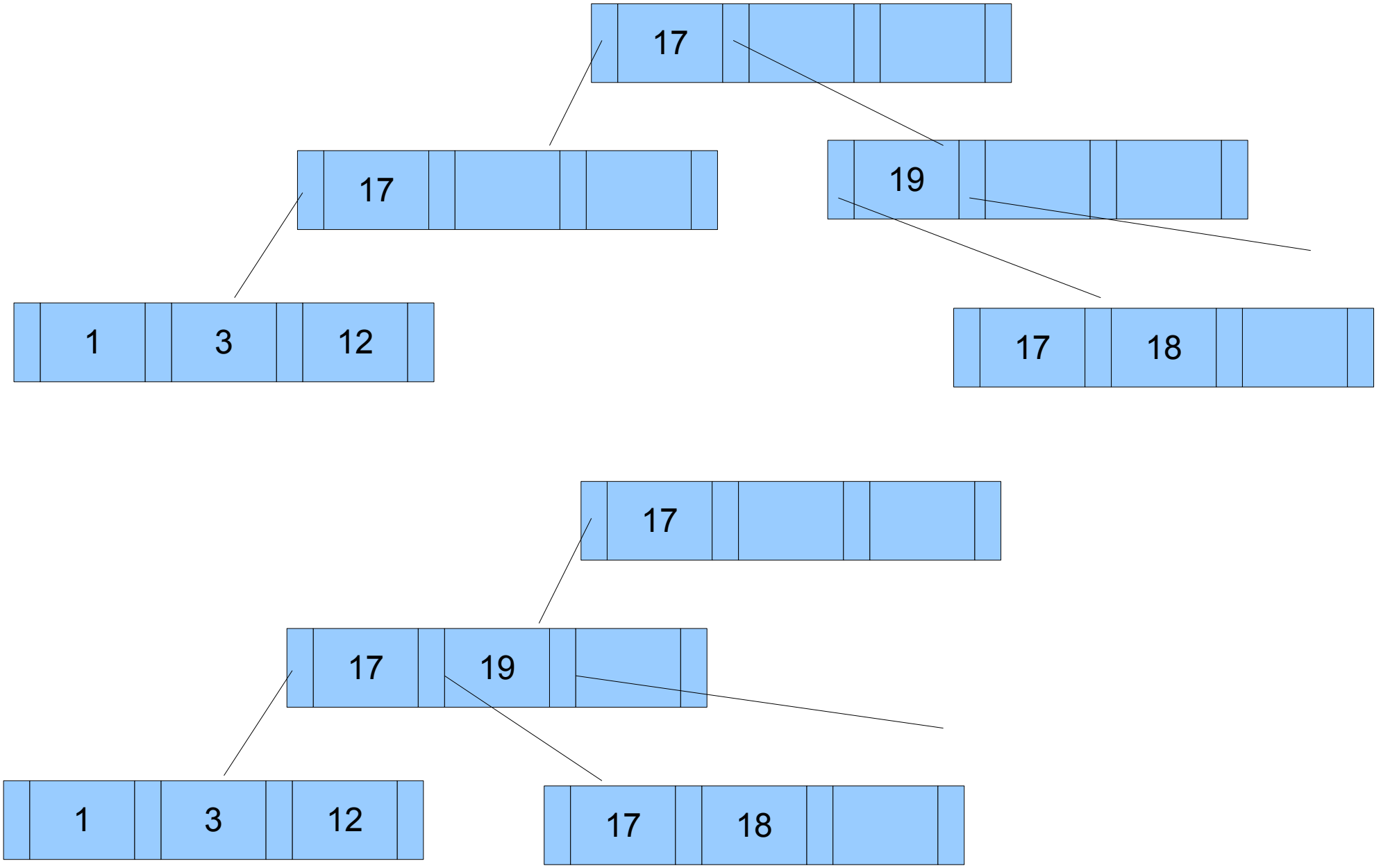
# B+ tree deletion



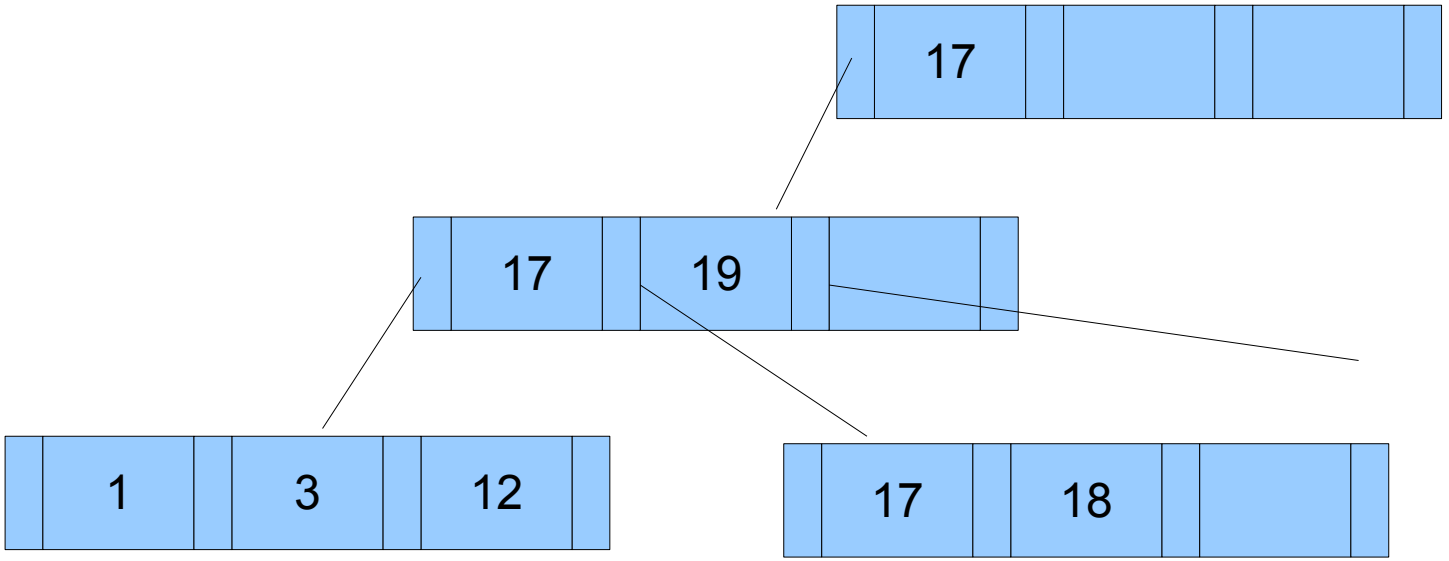

Remove 6

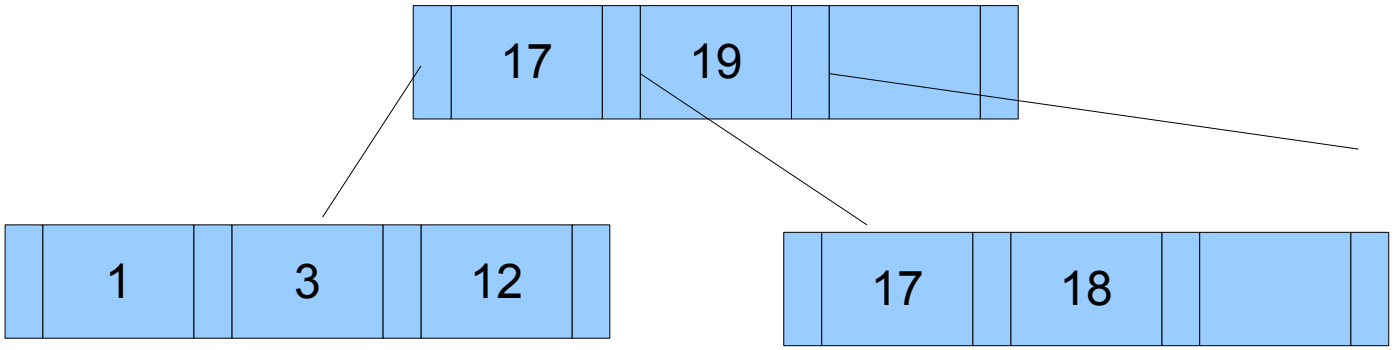


# Deletion...cont



# Deletion...cont



# B+ tree deletion

- Operation on leaves and internal nodes the same
- Need to think a bit about the correct value for the 'middle' separating key